

# THE ANNALS

AND

## MAGAZINE OF NATURAL HISTORY.

[EIGHTH SERIES.]

No. 3. MARCH 1908.

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XXXII.—*New African Phlebotomic Diptera in the British Museum (Natural History).*—Part I. *Tabanidæ*. By ERNEST E. AUSTEN.

THE interest excited at the present time by blood-sucking flies, in view of the possibility that they may act as carriers of micro-organisms pathogenic to man or domestic animals, supported by an appeal for specimens circulated by H.M. Foreign and Colonial Offices throughout the British Empire, has resulted during the last year or two in the acquisition by the British Museum (Natural History) of a certain amount of material, chiefly from Africa, including many new species. Some of the latter, from Tropical Africa, are described in the following pages, and descriptions of others, including a number of additional species of *Hematopota* (a genus of which the African continent is apparently the headquarters), will be published shortly in subsequent communications in this series. The types of all the new species described below are in the British Museum (Natural History). Coloured figures of the majority will appear later in an official publication.

### *PANGONINÆ.*

Genus *CADICERA*, Macq.

*Cadicera quinquemaculata*, sp. n.

♀.—Length (2 specimens) 14.5 to 16.25 mm.; width of  
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head 5 to 5·3 mm. ; width of front at vertex 0·6 mm. ; width of third segment of abdomen 7 to 7·5 mm. ; length of wing (perfect only in one specimen) 15 mm.

*Dorsum of thorax clove-brown\**, slightly pollinose though shining, with tufts of shining golden-yellow hair on sides ; first segment of abdomen dull, sepia-coloured ; remaining segments shining black, with a triangular patch of silvery-white appressed hair on each posterior angle of second segment, and a median patch of shining appressed golden-yellow hair on fourth, fifth, and sixth segments, the last patch continuous with a smaller area of similar hair on seventh segment ; wings ochraceous buff, anterior portion of proximal half brown and apex infuscated ; femora black or blackish brown ; tibiæ cream-buff, with a broad blackish-brown band on distal third.

*Head* black or blackish brown, occipital region, jowls, margins of face, and a transverse band above base of antennæ greyish pollinose ; front above this band and face shining (denuded ?), latter with long and sparse blackish-brown hairs on sides ; under surface of head clothed with blackish-brown hair ; ocelli wanting ; *palpi* black, not shining, clothed with coarse black hair, last joint less swollen and more pointed at the tip than in *C. rubramarginata*, Macq. ; *antennæ* black. *Thorax* : median area of dorsum clothed with short blackish-brown hair, which passes into pale golden-yellow hair in front and behind ; the conspicuous lateral tufts of golden-yellow hair are below the ends of the transverse suture and on the postalar calli ; pleuræ and pectus seal-brown, clothed with blackish-brown hair. *Abdomen* : first segment clothed with brown hair, a short row of silvery-white hairs on posterior margin on each side near posterior angles ; patches of silvery-white hair on second segment transversely elongate, scattered hairs extending almost to middle line, where there are a few golden-yellow hairs ; a few whitish or yellowish hairs on posterior angles of fourth segment ; remainder of dorsum, except where marked with patches of golden-yellow hair, clothed with short appressed black hair ; patch of golden-yellow hair on fourth segment commencing a little before the middle and extending to hind margin ; patches on fifth and sixth segments in shape of truncated equilateral triangles reaching to front margins, and with their bases resting on hind margins ; venter clothed with minute appressed black hairs, with patches of silvery hair on second and fourth segments towards the sides. *Wings* : brown area

\* For names of colours, see Ridgway, 'A Nomenclature of Colors for Naturalists' (Boston : Little, Brown, & Company, 1886).

on proximal half extends to end of stigma and down to fifth vein, though the distal extremity of the second basal cell may be somewhat lighter; apical infuscation commencing on costa above fork of third vein and extending to lower branch of latter; third vein infuscated throughout its extent. *Squamæ* whitish. *Halteres* dark brown. *Legs*: front tarsi brown, lighter at base of first joint; middle and hind tarsi dark brown, first joint except tip cream-buff.

Cape Colony, South Africa.—Two specimens (*co-types*): one individual from Pirie Bush, near King William's Town (*A. N. Stenning*); the second specimen without precise locality or other data. These are the two specimens referred to by Miss Ricardo (*Ann. & Mag. Nat. Hist. ser. 7, vol. v. 1900, p. 101*), who, however, was prevented from seeing that both belonged to the same species, since at the time when her paper was written the specimen without data was not set, and its abdomen was consequently concealed by its wings.

*Cadicera quinquemaculata* cannot be confused with any of the other species of this genus at present described, from which the markings of the tibiæ are alone sufficient to distinguish it without difficulty. It presents, however, a deceptive resemblance in general appearance and markings to *Corizoneura obscura*, Ricardo, the type of which is from Blantyre, Nyasaland Protectorate. Nevertheless, apart from other differences, the *Corizoneura* can be distinguished by the hair on the under side of the head being yellowish white instead of blackish brown, by that on the pleuræ being largely yellowish instead of entirely blackish brown, by the much duller tibiæ, the burnt-umber tips of which do not present nearly such a sharp contrast to the remainder, and by the hind tarsi being entirely russet.

Miss Ricardo's statements (*loc. cit. p. 100*) that in *Cadicera* "ocelli are present" and that in *C. rubramarginata*, Macq., ocelli are "present and distinct" are somewhat misleading, as will be seen from the following results of an examination of the Museum material belonging to this genus. The single specimen (a ♀) of *C. rubramarginata* in the Museum collection has the anterior ocellus alone; a ♂ and two ♀♀ of *C. melanopyga*, Wied., show no ocelli, but a third ♀ of this species has the anterior ocellus alone, which is very minute; in one of four ♀♀ of *C. chrysostigma*, Wied., there is a still more minute anterior ocellus, but the other two ocelli are wanting, and the remaining specimens of this species exhibit no trace of ocelli whatever; the single specimen (a ♂) of *C. crassipalpis*, Macq., has likewise no

trace of ocelli; lastly, in the two co-types of *C. quinque-maculata*, Austen, ocelli are similarly absent. It would appear, then, that in *Cadicera* the ocelli are either obsolete or in a vestigial condition, represented, if present at all, solely by the anterior ocellus. The statement "Pas d'ocelles distincts" in Macquart's diagnosis of the genus is therefore reasonably accurate.

*Pangonia biclausa*, Lw., = *Cadicera rubramarginata*, Macq., and represents a variety with the fourth posterior cell closed. Loew's remarks on his "Varietät" (Dipt.-Fauna Südafr. p. 91) are sufficient to prove this. Giglio-Tos (Ann. Soc. Ent. Fr., année 1895, p. 357) is in error in thinking that *P. biclausa*, Lw., should be referred to the genus *Scione*, Walk.

*Pangonia brevis*, Lw., which also has the fourth posterior cell closed, likewise belongs to the genus *Cadicera*, Macq., and has nothing to do with *Scione*, Walk. (cf. Ricardo, loc. cit. p. 109). *Cadicera brevis*, Lw., is closely allied to and possibly identical with *C. (Pangonia) melanopyga*, Wied. There can be no doubt that the closed or open condition of the fourth posterior cell is a variable character in *Cadicera*.

#### Genus PANGONIA, Latr.

##### *Pangonia compacta*, sp. n.

♀.—Length (6 specimens) 13·5 to 14·6 mm.; width of head 4·6 to 5 mm.; width of front at vertex just under 1 mm.; length of proboscis 6 to 7 mm.; length of wing 11·5 to 12 mm.; greatest width of wing 4·75 mm.

*Compactly built, thick-set species, with short and relatively broad wings, and fourth as well as first posterior cell closed before reaching margin; dorsum of thorax dark olive-yellow pollinose; first three segments of abdomen ochraceous, remainder black or blackish brown, with lighter hind borders; wings tinged with luteous; femora black or blackish brown, extreme tips and tibiæ and tarsi buff.*

*Head* grey pollinose, yellowish on the front, vertical region brownish; a shining black median triangle on upper part of front, its base a little above halfway between base of antennæ and occipital margin, and its apex directed backwards; front part of jowls dark brown; under side of head clothed with yellowish-white hair, upper part of front with short yellowish hair; *palpi* brown; first joint of *antennæ* blackish,

second joint dusky with a reddish tinge, third joint ferruginous, first and second joints slightly yellowish pollinose, first joint with long brownish hairs above; proboscis curving downwards. *Thorax* clothed with yellowish pile, longer and somewhat paler on pleuræ. *Abdomen*: first segment with a black median blotch, not reaching hind margin and almost concealed by scutellum; second segment with a median black spot roughly resembling a truncate triangle, which has its base resting on front margin and scarcely extends beyond middle of segment; second and third segments with a more or less distinct black patch on the lateral margins, and third segment usually also with some indistinct blackish markings near the middle line; first segment, except on median black area, clothed with short, appressed, shining, chrome-yellow hair; second and following segments, except on hind borders, clothed with short appressed black hair; hind borders of second, third, and fourth segments clothed with appressed, shining, silvery-white hair, forming transverse bands which are deeper towards the sides; hind borders of following segments similarly fringed with shining chrome-yellow hair, median portion of band on third segment also sometimes chrome-yellow; black hair on fifth and following segments longer, forming a fringe at tip of abdomen; ventral surface of first segment blackish, of second and third segments orange-buff, clothed with minute, appressed, shining, chrome-yellow hair, but without lighter bands on hind borders; ventral surface of fourth segment similar in coloration, but with hind border lighter, and with base or a band across the middle dark brown; ventral surface of remaining segments black or blackish brown, with hind borders yellow and clothed with chrome-yellow hair. *Wings*: first posterior cell closed at a distance of from 0.75 to 1 mm. before reaching margin; fourth posterior cell closed at one third of this distance or less from margin; stigma ochreous; a tuft of whitish hair on base of costa, conspicuous when wings are in resting position. *Squamæ* porcelain-like. *Halteres*: stalk ochraceous, knob yellowish white, conspicuous. *Legs*: coxæ yellowish-grey pollinose, clothed with yellowish hair; femora clothed with black, tibiæ with bright cream-coloured hair.

Mashonaland, Southern Rhodesia: type and five other specimens from Salisbury, April, November, December 1899, and March 1900 (*G. A. K. Marshall*).

In addition to the foregoing, the Museum collection contains a series of specimens of what appears to be a subspecies

of *P. compacta*, and may be designated and characterized as follows:—

*Pangonia compacta centralis*, subsp. n.

♀.—Length 11·3 to 11·6 mm.; length of wing 10 mm.; greatest width of wing 3·9 to 4·1 mm.

*Agreeing in all respects with the typical form of P. compacta except:—in its diminutive size (not exceeding 12 mm. in length), in the relatively somewhat greater reduction in the dimensions of the median black spot on the second abdominal segment (which is generally of a quadrate or elongate quadrate shape, and does not reach the middle of the segment), in the usually greater depth of the pale hind border to the fourth segment (in which the blackish-brown area is sometimes so much reduced that the segment is almost entirely ochraceous), and in the darker colour of the wings, which have a more brownish tinge.*

Nyasaland Protectorate (British Central Africa): type and six other specimens from the Samulu stream, near Chibwano's, Chikala, 29. iii. 1906 (*Dr. J. E. S. Old*). The collector's field-note is as follows:—"Numerous only near the bank, in the heat of the day; flight rapid, with humming sound much like that ordinarily associated with large common flies. Several were found together in spots only; they rushed at once to the ankles and legs, and inserted the long proboscis. Vegetation—both short and long grass (1 to 5 feet), scrub, and *Ficus*-trees in the neighbourhood, and low green trees fairly thick on the banks."

In coloration and markings *Pangonia compacta* resembles *P. rüppellii*, Jaenn., the type of which was collected in Abyssinia, from which, however, it can be distinguished by its broader and bulkier body, shorter and broader wings, and closed fourth posterior cell. In spite of the latter character, which will also serve to differentiate the species from most if not all other hitherto described African representatives of the genus in its restricted sense, *Pangonia compacta* is a true *Pangonia*, and cannot be referred to *Scione*, Walk. (*Diclisia*, Schin.), a South-American genus the species of which have hairy eyes and quite a different *facies*. In view of the number of specimens (six of the typical form and seven of the subspecies *centralis*) available for comparison, and the fact that the same character is found in all, it is impossible to consider the closure of the fourth posterior cell as a mere aberration; *P. compacta* and the following species, in which the fourth posterior cell is likewise closed, must therefore be regarded as forming a group distinguished from its congeners by the character in question.

*Pangonia fodiens*, sp. n.

♀.—Length (1 specimen) 13·5 mm.; width of head 4·5 mm.; width of front at vertex 0·6 mm.; length of wing 10·6 mm.; greatest width of wing 4·25 mm.

Fourth as well as first posterior cell closed before reaching margin of wing.—Dorsum of thorax as in foregoing species; first segment of abdomen straw-yellow and pollinose, except black area beneath scutellum, second and third segments ochraceous, remainder deep black, with buff-coloured hind borders, fringed with shining yellowish hair; basal half of venter cream-buff, second and third segments clothed, except on basal angles, with yellowish-white hair; fourth and following segments of venter deep black, with pale hind margins, very narrow and inconspicuous on fifth, sixth, and seventh segments; wings luteous, not relatively broad; legs as in foregoing species, but last two joints of front and middle tarsi brown, and tips of other tarsal joints brown or brownish.

Head as in foregoing species, but face distinctly less produced, shining black callus on upper half of front guttate instead of triangular, and hair on upper part of front black or blackish; palpi black; coloration of first and second joints of antennæ as in *P. compacta*, though first joint distinctly shorter; third joint wanting. Thorax as in foregoing species. Abdomen: dorsum of second and third segments as in foregoing species, but median basal black triangle on second segment broader and not reaching to middle of segment; basal angles of ventral surface of second and third segments clothed with minute black hairs. Halteres as in foregoing species.

Nyasaland Protectorate (British Central Africa): Samulu stream, near Chibwano's, Chikala, 29. iii. 1906 (*Dr. J. E. S. Old*): taken at same time and place as the specimens of *Pangonia compacta centralis* referred to above.

Although presenting a strong superficial resemblance to *Pangonia compacta*, *P. fodiens* can be distinguished at once by its narrower head and body, less prominent face, and the fact that the tarsi are tipped with brown; the front above the antennæ is also narrower; the remaining differences are sufficiently indicated in the above description. For systematic position, see remarks above, with reference to *Pangonia compacta*.

*Pangonia oldii*, sp. n.

♂ ♀.—Length, ♂ (10 specimens) 15·5 to 18 mm., ♀ (11 specimens) 15·2 to 17·6 mm.; width of head, (♂) 5 to 5·5



mm., (♀) 5 to 5.75 mm.; width of front of ♀ at vertex 0.75 to 1 mm.; length of proboscis, (♂) 8.75 to 12 mm., (♀) 7.3 to 8.75 mm.; length of wing 13.6 to 15.6 mm.

*Dusky, dark-winged species, with first two segments of abdomen tawny, remainder blackish brown with lighter hind borders; median area of third segment often more or less tawny; posterior angles of second, fourth, and fifth segments clothed with silvery-white hair; on second segment silvery hair forms continuous band on hind margin, broadening out on each side of middle line; wings uniformly brownish, first posterior cell closed before reaching margin, fourth posterior cell open; hind legs and front and middle femora chestnut, tips of front and middle tarsi brown, basal joints and front and middle tibiæ ochraceous buff.*

*Head* yellowish pollinose, a brown or brownish patch on middle of front in ♀; face moderately prominent, with a shining black somewhat triangular callus on each side, in ♂ extending to front margin of buccal cavity; ♀ with a shining reddish-brown, elongate, quadrate, median callus between and immediately above bases of antennæ, and a shining dark brown ocellar spot; sides of face below tubercles brownish; in ♀ terminal and most prominent portion of face brown, or, when denuded, shining dark brown; anterior portion of lower margin of jowls dark brown; under side of head clothed with yellowish-white hair; *palpi* ferruginous; *antennæ* orange-rufous, first and second joints pollinose, in ♂ upper side of first and upper and under sides of second joint bearing long black hairs, which in ♀ are confined to upper side of second joint. *Thorax*: dorsum dark brown, yellowish pollinose, and clothed with short yellowish pile, which is intermixed with blackish hairs; lateral margins edged with longer pale yellowish hair, forming a fringe on each side, which includes the postalar callus; the usual longitudinal markings on dorsum, as also the transverse suture, rendered somewhat more distinct by denser pollen, especially in ♀; pleuræ clothed with yellowish pile, a tuft of black or blackish-brown hair on mesopleura, below and a little in front of base of wing. *Abdomen*: first segment with a blackish median area, wholly or partly concealed by scutellum; near this dark blotch clothed with blackish hair, elsewhere with shining cadmium-yellow pile, especially conspicuous on posterior angles and hind margin; second and following segments, except where clothed with silvery-white pile as indicated in diagnosis above, covered with short black hair; in ♂, second segment usually with a small



black median basal spot or triangle; hind borders of third and following segments dull, sepia-coloured in ♂, mummy-brown in ♀; silvery-white hair on posterior angles of fourth segment covering from one fourth to one third of hind margin on each side; lateral margins of sixth or sixth and seventh segments also with yellowish or whitish hair: *ventral surface*, extreme base of first segment blackish or brownish; remainder of first and whole of second segment tawny; in ♂ base of third segment sometimes likewise tawny, but tawny area of venter sharply marked off from blackish-brown apical portion; in venter of ♀ the two colours are usually less sharply contrasted, and the central portion of the third and following segments is often more or less tawny, the blackish-brown colour being confined to the sides of the segments; venter of ♂ clothed with minute black hairs, denser and somewhat longer on apical segments; second segment with more or less conspicuous silvery-white hairs near hind margin, and similar hairs often present near hind margin of fourth segment on each side; sixth and seventh segments with pale yellowish hairs on posterior angles: venter of ♀ with more pale hairs; second segment with minute silvery hairs interspersed among the black except on basal angles; pale yellowish hairs largely present on fourth, also clothing sides of fifth segment, and predominant on following segments. *Halteres*: stalk brownish, knob buff to ochraceous buff. *Legs*: front and middle femora and hind legs (except under side of tarsi) clothed with black hair; under side of hind tarsi clothed with ferruginous hair; front and middle tibiae clothed with pale yellowish hair.

Nyasaland Protectorate (British Central Africa): types of ♂ and ♀ and 16 other specimens from the Nangondo stream and its vicinity, Masanji-Shire District, 31. iii. 1906 (*Dr. J. E. S. Old*); 3 specimens from the Upper Shire River, near Mpimbi, 20 miles west of Zomba, 1100 feet, May 1905, "In large numbers following the nswala antelope" [*Epyceros melampus*] (*Major F. B. Pearce, C.M.G., Deputy Commissioner*). The field-note by *Dr. Old* (after whom I have much pleasure in naming this fine species, as a slight recognition of the efforts made by him during the last four years to supply the National Collection with specimens of the blood-sucking Diptera of British Central Africa) is as follows:—"Nangondo stream: here and some miles beyond, where I shot an mpala [*Epyceros melampus*], which seemed to attract them after a little while, a large *Pangonia* was seen. I send several specimens of it. It makes a loud

humming noise, resembling that of a large bee, and on alighting immediately thrusts its long proboscis through the skin."

*Pangonia oldii* is closely allied to *P. zonata*, Walk. (a Somaliland species, the type of which is from Tajurrah), but may be distinguished as follows:—In *P. oldii* the shining callus on each side of the face is longer and less abruptly truncated; the sides of the second abdominal segment in front of the hind border are clothed with black instead of golden-yellow hair; the hair on the posterior angles of the second and fourth abdominal segments is pure white instead of yellowish; on the fourth segment these white hairs do not extend to the middle line, whereas the fourth abdominal segment of *P. zonata*, ♀, has a continuous broad hind border of yellowish hair; on the ventral surface the median portion of the second abdominal segment of *P. oldii*, ♀, is clothed largely with silvery hair, that of the same segment of *P. zonata*, ♀, with yellowish hair; the ventral surface of the dark segments at the distal extremity of the abdomen of *P. oldii*, ♀, is clothed with black and yellowish hair intermixed, while in the case of *P. zonata*, ♀, the ventral surface of the same segments is exclusively clothed with a thick coat of yellowish hair: other differences are to be found in the colour of the legs and hair clothing them.

#### SYNONYMY.

*Pangonia alboatra*, Walk. (Ins. Saund., Dipt. i. (1850) p. 13.—Cape of Good Hope), = *P. angulata*, Fabr. In Walker's type the white hind border to the second abdominal segment is interrupted in the middle, but the interruption is apparently due to denudation, since, when the abdomen is viewed obliquely from the right front, the hinder border appears to be complete.

*Pangonia magretti*, Bezzi (Bull. Soc. Ent. Ital. xxxiii. (1901) p. 7.—Eritræa), is, perhaps, merely a dark form or subspecies of *P. rüppellii*, Jaenn., the type of which is from Abyssinia.

#### TABANINÆ.

Genus HÆMATOPOTA, Mg.

*Hæmatopota fulva*, sp. n.

♀.—Length (6 specimens) 8·5 to 10·4 mm.; width of

head 2.4 to 3.2 mm.; width of front at vertex 1 mm.; length of wing 8.5 to 10 mm.

*Tawny; thorax somewhat darker, russet; abdomen unicolorous, without markings; wings ochraceous, with a broad light brown or drab-coloured border, commencing just beyond the stigma (above the end of the backwardly-directed appendix to the upper branch of the third vein) and extending to the anal angle, or nearly so; legs tawny, front tarsi and tips of joints of middle and hind tarsi brown.*

*Head tawny; frontal callus fairly deep, its upper margin straight; brown spot on each side of front well-marked and conspicuous, median frontal spot absent; a small reddish-brown fleck below callus in middle line, between and just above bases of antennæ; face with a shining triangular spot on each side, its apex directed backwards and extending on to jowl; hair clothing jowls tawny; palpi tawny, clothed with blackish mixed with bright tawny hair; antennæ tawny, last three annuli of third joint black, expanded portion of third joint sometimes considerably infuscated towards the tip, first joint short, not incrassated, first and second joints clothed with black hair, last annulus of third joint equal in length to the two preceding annuli taken together. Thorax without conspicuous markings; close to front margin the commencement of a narrow light grey median stripe, at some little distance on each side of which is a faintly indicated light stripe (sometimes tawny olive) extending to transverse suture; pleuræ, pectus, and scutellum of same colour as dorsum. Abdomen clothed with minute ochraceous hairs. Wings: characteristic *Hæmatopota*-markings very faint, noticeable mainly in the basal halves of the posterior cells, from the second to the fifth; no dark blotch beneath stigma, which is large, elongate, and cinnamon-coloured; first and second basal cells, first submarginal cell as far as fork of third vein, and first posterior cell to same distance without dark markings; one or two faint darker blotches in discal cell, and two or three in apical portion of anal cell; two faint, pale, sinuous streaks usually visible in apex of wing, running from second to third veins, beyond fork of latter; extreme bases of second to fifth posterior cells usually not infuscated; lower down a more or less distinct double row of curved light markings running across these cells, in a direction roughly parallel to hind margin, the upper row sometimes merged in the pale bases of the cells: no pale flecks along hind margin itself, at tips of veins; a doubly curved light streak across the axillary cell beyond the middle; when the wing is viewed against a dark back-*

ground, remains of the usual rosettes round the fork of the third vein, distal extremity of the discal cell, and distal extremity of the second basal cell can be seen more or less distinctly in different specimens; appendix to upper branch of third vein rather long. *Halteres* mummy-brown, stalk ochraceous buff.

Angola: type and five other specimens from Benguella, February 1905 (*Dr. F. Creighton Wellman*). Dr. Wellman sends the following note with reference to this species:—“Found in sedgy and grass-grown marshes, near large streams. Like others of its genus, a vicious biter; fairly active; twelve specimens taken.” The collector is to be congratulated on the discovery of this remarkable species, which, owing to its peculiar coloration, cannot be confused with any of its congeners known to me from any part of the world.

*Hamatopota denshamii*, sp. n.

♀.—Length (6 specimens) 9·6 to 11·3 mm.; width of head 2·8 to 3 mm.; width of front at vertex 1 mm.; length of wing 8·6 to 10·3 mm.

*Olive-brown, with five olive-grey longitudinal stripes on dorsum of thorax, and a narrow median light stripe on abdomen; frontal callus black; wings tinged with buff, and with a brown border to the tip and hind margin, as far as the end of the sixth vein; coxæ dark grey, femora olive- or greyish brown.*

*Head* smoke-grey to yellowish grey, vertex with a pair of faint light brown longitudinal stripes, which meet together above callus; *frontal callus* of moderate depth, its upper margin slightly convex and rising to a point in the median line, which in rubbed specimens may be produced into a shining ridge; brown spot on each side of front usually well marked, median frontal spot absent; *palpi* pinkish buff, elongate, blunt at the tips, clothed with black interspersed with light yellowish hair; first and second joints of *antennæ* ochraceous buff, first joint not swollen, expanded portion of third joint dark brown, rufous at the base, last three annuli black, last annulus equal in length to the two preceding annuli taken together. *Thorax*: median stripe on dorsum only half as wide as admedian stripes, latter wider in front; *pleuræ* and *pectus* olive-grey. *Abdomen* clothed with minute, appressed, buff-yellow hairs; venter olive-grey on each side. *Wings*: light markings rather coarse; against a dark background remains of the usual three rosettes can be distinguished, otherwise the markings are confined to the brown

border; two sinuous streaks running across tips of sub-marginal cells, beyond fork of third vein, the distal streak breaking up into a series of detached markings running across the posterior cells; axillary cell faintly tinged with brown, with a broad pale streak running parallel with the wing-margin and continued along the sixth vein, thus enclosing an area of darker colour; basal, anal, and discal cells, proximal two-thirds of first posterior cell, and bases of remaining posterior cells not infuscated; a faint dark marking usually visible across middle of discal cell; *stigma* dark brown, conspicuous. *Halteres* light russet to brown, stalk yellowish. *Legs*: tibiæ ochraceous buff, clothed with minute ochraceous hairs, distal two-thirds of front tibiæ brown; front tarsi dark brown, middle and hind tarsi lighter brown, ochraceous buff at base.

Uganda, Nile Province: type and three other specimens taken between Nimule and Wadelai, June 1906 (*the late Dr. W. A. Densham*); two additional specimens from Nimule, November 1904, "on cattle" (*Capt. E. D. W. Greig, I.M.S.*). Named in memory of the late Dr. W. A. Densham, who, when forwarding his specimens, wrote as follows:—"This species was a great pest in June 1906 between Nimule and Wadelai, especially where the grass was long. It did not occur particularly near water, but chiefly along native paths, through open rolling grassy country. Natives are much annoyed by its bite."

*Hæmatopota denshamii* is closely allied to *H. similis*, Ricardo, and *H. unicolor*, Ricardo, both of which also occur in Uganda; from the former, however, it is distinguished by the colour of the basal joints of the antennæ, the deeper frontal callus, and the last annulus of the third joint of the antennæ being as long as the two preceding joints taken together, instead of but little longer than either; from *H. unicolor* it may be distinguished by the colour of the frontal callus, and by the first joint of the antennæ not being swollen.

*Hæmatopota semiclara*, sp. n.

♀.—Length (7 specimens) 7·5 to 9·6 mm.; width of head 2·25 to 2·6 mm.; width of front at vertex 0·8 mm. to 1 mm.

Grey, body narrow; thorax light olive-grey, with four lighter or darker brown longitudinal stripes; abdomen olive-grey, second to sixth segments inclusive more or less olive on each side of median line, leaving a narrow light median stripe; wing-markings exceedingly faint, tip of wing and hind border

lightly infuscated and variegated with vestiges of the usual light marks, but central area of wing devoid of markings and semi-hyaline; legs dull tawny, tips of tarsi darker.

Head grey on front, yellowish grey on face and jowls; frontal callus dark brown, sometimes more or less ochraceous, very narrow from above downwards, upper margin often produced upwards into a triangular prominence in middle line; blackish-brown or black spot on each side of front well marked, when seen from above it appears surrounded by a very light grey area, median frontal spot absent; palpi cream-buff, clothed on outer side with black hair intermixed with some ochraceous hairs; antennæ short, first and second joints ochraceous buff, first joint slightly incrassated, clothed like the second with black hair, third joint dark brown, ochraceous at base, last three annuli black, last annulus about equal in length to the two preceding annuli taken together. Thorax: dark stripes on dorsum often not reaching front margin; scutellum with a brown fleck on each side, which is sometimes obsolete. Abdomen: olive patches on second and majority of following segments usually quadrate in shape, lateral margins of segments grey; venter with an olive median stripe. Wings: area devoid of markings includes basal, anal, and discal cells, and proximal two-thirds of first submarginal and first posterior cells; second and third posterior cells also without markings at extreme base; stigma elongate, dull tawny ochraceous to dark brown, conspicuous. Legs: front tarsi reddish brown, last joints of middle and hind tarsi brown.

Angola: type and five other specimens from the vicinity of Bailundo, November to December 1904 (Dr. F. Creighton Wellman); one specimen from Benguella, 1905 (Dr. F. C. Wellman). When forwarding these flies Dr. Wellman wrote:—"I took about 60 specimens of this species in long grass in a treeless valley, and in thin bush on the side of a mountain, 220 to 300 miles from the coast. Sluggish. Eyes bright green when alive. Some specimens were infested with a minute red tick." Like the foregoing species, *Hematopota semiclara* is allied to *H. unicolor*, Ricardo, but it is distinguished by its smaller size, more slender shape, less swollen first antennal joint, and by the wing-markings, *inter alia* by the discal cell being entirely semi-hyaline.

#### Genus TABANUS, Linn.

##### *Tabanus denshamii*, sp. n.

♀.—Length (4 specimens) 17 to 21 mm.: width of head

6 to 7 mm.; width of front at vertex 0.6 mm. to just under 1 mm.; length of wing 14 to 17 mm.

*Seal-brown; longitudinal stripes on dorsum of thorax and a median series of very broad truncated triangles on abdominal segments grey or smoke-grey; wings with extreme base, costal border as far as end of first longitudinal vein, and base of anal cell dark brown; veins in proximal two-thirds of wing distally suffused with brown.*

*Head*: front, face, and jowls grey pollinose; subcallus cream-buff pollinose; face and jowls clothed with whitish hair; sides of front only slightly convergent below; *frontal callus* and its linear extension (when visible) chestnut, callus elongate quadrate, rounded above, touching or but narrowly separated from the eye on each side; ocellar region slightly brownish; eyes bare; *palpi* tapering to a point, clothed with pale yellowish hairs, sometimes thickly interspersed with black hairs on outer side; first joint of *antennæ* pollinose rufous, its upper angle blackish brown, second joint dark brown, third joint black or blackish brown. *Thorax*: pectus, pleuræ, a broad ill-defined stripe above base of wings, and three sharply marked dorsal stripes, the median one very narrow and scarcely extending beyond middle, grey; a stripe of black hair in front of base of wing; postalar callus bearing a conspicuous tuft of whitish hair; grey dorsal stripes clothed with yellowish hair, dorsum elsewhere clothed with dark brown or blackish hair, pectus and pleuræ with whitish hair; *scutellum* grey pollinose, ground-colour ferruginous, brownish at base, clothed at base and on disk with dark brown hair, margin fringed with whitish hair. *Abdomen*: median series of very broad, truncated, smoke-grey triangles on dorsum very conspicuous and sharply defined, forming a continuous series extending from the second to fifth segment inclusive; on the first segment there is merely a median grey spot, in contact with the truncated apex of the triangle on the second segment; on the second, third, and fourth segments the broad bases of the triangles, which rest on the hind margin, extend on each side considerably beyond the truncated apex of the following triangle; a median grey mark sometimes visible on sixth segment; second, third, and fourth segments with a small, somewhat oval, grey spot on each side of the median triangle, and much less pronounced than the latter; first segment lightly greyish pollinose when viewed obliquely from behind; triangles clothed with minute pale yellowish hairs; lateral margins of segments clothed with whitish hair; *venter* greyish pollinose, clothed with minute pale



yellowish hairs, except last segment, which is clothed with coarse, erect, and much longer black hair, and median region of penultimate segment, which is clothed with short black hair; ground-colour of venter ferruginous, with a very broad, interrupted or subinterrupted, dark brown median stripe; second and following segments with a narrow brown posterior band in front of hind margin; extreme hind margins cream-buff. *Wings*: among the veins suffused with brown are the base of the anterior intercalary vein and the posterior transverse vein (together forming the distal boundary of the discal cell), and the extreme base of the upper branch of the third longitudinal; alula and base of anal angle brown, central portion of alula paler; *squamae* blackish brown. *Halteres* brown, knobs usually yellowish. *Legs*: dull ferruginous pollinose, front femora, tips of front tibiae, and all tarsi brownish black; hair for the most part whitish or yellowish, a conspicuous fringe on outside of hind tibiae.

Uganda and North-eastern Rhodesia: type and two other specimens from Unyoro, Uganda, halfway between Masindi and Murchison Falls, January 1907 (*the late Dr. W. A. Densham*); a fourth specimen from Fwambo, N.-E. Rhodesia (near the south-eastern end of Lake Tanganyika), between October 1892 and February 1893 (*W. H. Nutt*).

This exceedingly striking species has been named in honour of the late Dr. W. A. Densham, Medical Officer, Sleeping Sickness Extended Investigations, Uganda, who unfortunately lost his life at the end of May 1907, through being charged by a wounded buffalo. Dr. Densham's specimens, which were received barely two months before his death, formed part of a small but interesting collection of blood-sucking Diptera from Uganda, most carefully pinned, in excellent condition, and accompanied by notes. Another collection had previously been received from Dr. Densham, and there can be no doubt that, had it not been for his untimely death, our knowledge of the blood-sucking flies of one of the newest dependencies of the British Crown would have been largely augmented by the efforts of this painstaking investigator.

Dr. Densham's field-note on this species is as follows:—  
 "I saw this fly for the first time in January 1907, halfway between Masindi and the Murchison Falls. In its flight and manner of alighting it resembles Fly no. 4 [*Tabanus taniola*, Pal. de Beauv.], and I overlooked the first that appeared. I found it in several camps in the neighbourhood, but its distribution seems very local. The natives say that it is a

elephant-fly, but I shot an elephant in the vicinity, and saw no biting flies at all on or near it."

*Tabanus denshamii* is allied to *T. nyasæ*, Ricardo (Ann. & Mag. Nat. Hist. ser. 7, vol. vi. 1900, p. 164:—syn. *T. tarsalis*, Adams, Kansas Univ. Sc. Bull. vol. iii. (xiii.) 1905, p. 151), the type of which is from British Central Africa. *T. nyasæ*, however, is distinguished by its more hyaline wings, less deeply suffused veins, the costal border to end of first vein being merely tawny instead of dark brown, absence of infuscation at the base of the upper branch of the third vein, much larger lateral abdominal spots, narrower median triangles on the abdominal segments, and paler femora and tibiae.

*Tabanus wellmanni*, sp. n.

♀.—Length (6 specimens) 11·25 to 12·3 mm.; width of head 4 to 4·5 mm.; width of front at vertex 0·5 mm.; length of wing 10 to 11·3 mm.

*Front* narrow, pearl-grey above; *thorax* clove-brown, with a pair of pearl-grey stripes scarcely extending beyond transverse suture, and a narrow transverse band of silvery pile on hind border; *abdomen* seal-brown, third and fourth segments each with a greyish-white median spot, bluntly triangular or semioval in outline, and clothed with shining, appressed cream-coloured hair.

*Head* clove-brown, front, face, jowls, and occiput grey pollinose, face and jowls clothed with white hair; *frontal callus* and *subcallus* (?denuded) dark brown, the former elongate quadrate, extending from eye to eye; *palpi* dark brown, slender, clothed with whitish hair; first and second joints of *antennæ* slate-grey, clothed above with minute black hairs, first joint also with whitish hairs below, third joint narrow, elongate, clove-brown, slightly ferruginous at extreme base. *Thorax*: grey dorsal stripes conspicuous when viewed from behind, the interspace also greyish, divided by a narrow median light brown stripe, each grey stripe with a light brown outer edging; ground-colour of transverse posterior band (including greater portion of post-alar calli) pearl-grey; *pectus* and *pleuræ* greyish pollinose, clothed with whitish hair; *scutellum* bluish-grey pollinose, upper portion of hind margin brownish. *Abdomen*: median spots with their bases resting on hind margins of segments, spot on third segment not reaching to front margin; sides of first segment, and posterior angles of second, third, and fourth segments grey, clothed with whitish hair; hind

margins of third and fourth segments, on each side of median spot, narrowly grey; venter greyish pollinose, basal portion of segments usually brownish; last two segments clothed with erect black hair, remainder with short, more or less appressed, whitish hair. *Wings* with a brownish tinge; stigma well defined, brown; *squamæ* dark brown. *Halteres* brown, knobs somewhat lighter. *Legs* clove-brown; tibiae, except tips, cream-coloured and clothed with whitish hair; second, third, and fourth joints of front tarsi strongly expanded.

Angola: type and five other specimens from the Chiyaka district, March 1906 (*Dr. F. Creighton Wellman*). I have much pleasure in naming this species after its discoverer, who states that it is a "pertinacious biter," and was "taken in a thick jungle" \*.

This and the following species are allied to *Tabanus insignis*, Lw., but present still closer resemblance to a new species which occurs in French Congo (Gaboon), and will shortly be described by M. Surcouf, of the Muséum d'Histoire Naturelle, Paris, under the name of *Tabanus argenteus*. From this species *T. wellmanii* is distinguished by the presence of the pearl-grey stripes on the thorax, by the band of silvery pile on the hind border being much less deep, by the scutellum being for the most part bluish grey instead of dark brown except at the base, and by the abdominal spots not being semicircular and their transverse diameter being much less: the width of each spot is less than that of the space between it and the lateral margin of the segment, instead of greater, as in *T. argenteus*.

*Tabanus sharpei*, sp. n.

♀.—Length (1 specimen) 11·5 mm.; width of head 4 mm.; width of front at vertex 0·6 mm.; length of wing 9·25 mm.

*Closely resembling foregoing species, but distinguishable by the abdominal markings and wider front.*—Clove-brown; front pearl-grey; thorax with a pair of narrow, well-defined, pearl-grey stripes, ending just beyond transverse suture, and hind border pearl-grey, clothed with silvery pile; abdomen with sides of first segment, a large quadrate blotch on posterior angles of second, and a doubly emarginate cross-band on hind

\* For description of *Chrysops wellmanii*, Austen, discovered by Dr. Wellman in the same district and at the same time, cf. Austen, Ann. & Mag. Nat. Hist. ser. 7, vol. xx., Dec. 1907, pp. 512-513.

borders of third and fourth segments, deepest in centre, light grey.

*Head* grey pollinose, face and jowls clothed with white hair; front narrowing anteriorly; *frontal callus* somewhat elongate, extending from eye to eye below, narrower above; *palpi* fairly broad at base, then tapering rapidly, cream-buff, clothed with whitish hair; first two joints of *antennæ* greyish, their upper angles blackish, first joint clothed for the most part with whitish hair, third joint clove-brown, its basal portion broad. *Thorax*: some yellowish hairs near anterior margin of dorsum, between the stripes; hair on latter whitish; pectus and pleuræ greyish pollinose, clothed with whitish hair; *scutellum* clove-brown, paler at extreme base. *Abdomen*: grey markings clothed with whitish hairs, ground-colour with blackish or dark brown hair; venter grey, with clove-brown cross-band at base of each segment, except first and second, which are entirely grey, and last segment, which is entirely clove-brown; erect coarse black hair on under side of last segment long. *Wings* hyaline, stigma inconspicuous; *squamæ* brownish. *Halteres* walnut-brown. *Legs*: femora dark greyish brown; tibiæ, except tips, cream-buff; front tarsi and tips of front tibiæ black; middle and hind tarsi, and tips of middle and hind tibiæ, seal-brown; front tarsi expanded; femora and tibiæ clothed with whitish or yellowish-white hair; whitish hairs also present on upper side of first three tarsal joints.

Nyasaland Protectorate (British Central Africa): a single specimen from Katumbe, North Nyasa, 6. xii. 1906 (*Dr. J. E. S. Old*). The collector's field-note with reference to this fly is as follows:—"Country, swampy jungle, with very tall, coarse reeds, and forest with low trees. Only game seen were bushbuck, waterbuck, and wart-hog; old eland spoor plentiful, and that of buffalo some months old." This species has been named after Sir Alfred Sharpe, K.C.M.G., C.B., Governor and Commander-in-Chief of the Nyasaland Protectorate, whose efforts on behalf of the big game of the territory under his administration have entitled him to the gratitude of all who have the welfare of the African fauna at heart.

For affinities of *T. sharpei* see notes on *T. wellmanii* above. Besides the differences already mentioned, *T. sharpei* can be distinguished from *T. wellmanii* by the hyaline wings, the practical absence of the stigma, and the narrower front tarsi, in which the angles of the expanded joints are more rounded and much less produced. From *T. argenteus*,

Surcouf, MS., *T. sharpei* is distinguished *inter alia* by the broader front, the much shorter and broader basal portion of the third joint of the antennæ, the shorter palpi, conspicuous grey stripes on the front part of the dorsum of the thorax, the shape of the abdominal markings, and the hyaline wings.

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XXXIII.—*On Phytosaurian Remains from the Magnesian Conglomerate of Bristol* (*Rileya platyodon*). By FRIEDRICH BARON HUENE, D.Sc., Tübingen, Germany.

[Plate VI.]

SOME years ago the writer published (Pal. u. geol. Abhandl. vi. (x.) 1902, pp. 62 & 63) a description of one humerus and two vertebræ from the Bristol Conglomerate as Phytosaurian, with the new name *Rileya bristolensis*. Now, after having finished the monograph of European Triassic Dinosaurs (which has not yet completely appeared), I find some more Phytosaurian bones, which I propose to describe here.

The tooth described by Riley and Stutchbury (Trans. Geol. Soc. v. 1836, pl. xxix. fig. 5) as *Palæosaurus platyodon* (and figured by Owen, 'Odontography,' 1845, pl. lxii. A, fig. 7) is not a Dinosaurian, but a Phytosaurian tooth. There is no difference between this tooth and some of the Belodont teeth in the Stuttgart Museum. The name *Palæosaurus* cannot be accepted, because it is preoccupied by Geoffroy for another reptile (Mém. Inst. xii. 1831, p. 48). As this tooth and seven other bones are the only Phytosaurian remains amongst a great many Dinosaurian bones, it is highly probable they belong to the same animal. Some of the bones alone have been called *Rileya bristolensis*, therefore the generic name *Rileya* must now comprise the tooth also. Of course the oldest of the specific names has to be applied, so the animal will be called *Rileya platyodon*, Riley and Stutchbury sp.

*Teeth*.—The outline of the broad and compressed tooth (type specimen in the Bristol Museum) is like that of a broad lancet-shaped leaf. The base is a little laced. The sharp anterior and posterior edges are finely serrated, so that in 1 mm. length there are little more than 3 denticules. The latter are disposed vertically to the border. The crown is 17 mm. long and 12.5 mm. in maximum breadth. Another tooth from Bristol is in the British Museum (Pl. VI. fig. 1).